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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/072,355	02/05/2002	Shashidhar Sathyanarayana	268/275	4274

34313 7590 01/25/2005

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EXAMINER

LAVIN, CHRISTOPHER L

ART UNIT

PAPER NUMBER

2621

DATE MAILED: 01/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/072,355

Applicant(s)

SATHYANARAYANA,  
SHASHIDHAR

Examiner

Christopher L Lavin

Art Unit

2621

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02/05/02.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |                                                                                                                                   |                                                                                         |
|-----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                              | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____                                                |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1 – 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Scampini (5,989,191).

3. In regards to claim 1, Scampini discloses a method for reducing Nonuniform Rotational Distortion (NURD, i.e., non-uniformity in the angular velocity), in an image, said image comprising a plurality of image vectors, each image vector having texture and each image vector being mapped to an angle in the image (col. 4, lines 13 – 23; col. 1, lines 31 – 35: An IVUS composed image comprises of a plurality of image vectors, contained within the image vectors are textures representing areas of reflection of the ultrasound wave. For an IVUS image to be put together the angles each image vector is obtained at inherently must be recorded for the method to work, this is a way of mapping each image vector to an angle.), the method comprising:

Computing an average, i.e., mean, frequency of the texture for each image vector (col. 7, lines 40 – 43; col. 5, lines 12 – 18: In this case the texture used is the tip of the catheter the transducer is contained within);

Estimating an angle (the percentage difference between velocities is an estimate of angle) for each image vector based on the average, i.e., mean, frequency for the respective image vector (col. 8, lines 44 – 49);

Remapping each image vector to the estimated angle for the respective image vector (col 4., 35 – 37).

4. In regards to claim 2, Scampini discloses the method of claim 1, wherein each image vector comprises a plurality of pixels, each pixel representing the amplitude of an echo pulse reflected from a certain image depth (col. 1, lines 31 – 35: An IVUS composed image comprises of a plurality of image vectors, contained within the image vectors are textures representing areas of reflection of the ultrasound wave.).

5. In regards to claim 3, Scampini discloses the method of claim 2, wherein the step of computing the average, i.e., mean, frequency for each image vector further comprises:

Computing a mean frequency of the texture for each pixel in each image vector (col. 6, line 66 – col. 7 line 8: Scampini essentially takes two image vectors for each angle. Scampini first takes an image vector where the pixels only represent the first reflection point, the catheter, the second image vector is the entire image. Scampini uses the first image vector to correct for NURD. The only pixels in the first image vector are those representing the catheter; col. 7, lines 40 – 43); and

Computing an average of the mean frequency for the pixels in each image vector (col. 7, lines 40 – 43: As Scampini only uses one texture for correcting NURD the mean of the texture is the average of the mean frequency for the pixels.).

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6. In regards to claim 4, Scampini discloses performing a Fourier transform in the paragraph starting at column 7, line 22. In the next paragraph Scampini discloses computing a mean of the frequency signal resulting from the transform.

7. In regards to claims 5 and 7, Scampini discloses the method of claim 1 and 3 (respectively), wherein the step of estimating the angle for each image vector further comprises:

Computing an integral, i.e. sum, of the average frequency for all of the image vectors (col. 8, lines 21 – 23: An integral is nothing more then a sum over a predetermined interval.)

Normalizing the integral, i.e. sum, to a predetermined value (col. 8, lines 21 – 23: “One full revolution” requires the predetermined value to be 360 degrees or  $2\pi$  radians); and

Estimating the angle for the each image vector based on the value of the normalized integral at the respective image vector (col. 8, lines 43 – 49).

8. In regards to claims 6 and 8, Scampini discloses the method of claim 5, wherein the predetermined value is  $2\pi$  radians (col. 8, lines 21 – 23: “One full revolution” requires the predetermined value to be 360 degrees or  $2\pi$  radians).

9. In regards to claim 9, Scampini discloses in the paragraph starting at column 8, line 58 that the method disclosed in claims 1 – 8 can be implemented in software. Claim 9 is rejected for the same reasons as those used to reject claim 1. The argument is analogous to that presented above for claim 1, and therefore the rejection to claim 1 is equally applicable to claim 9.

10. In regards to claim 10, claim 10 is rejected for the same reasons as those used to reject claim 2. The argument is analogous to that presented above for claim 2, and therefore the rejection to claim 2 is equally applicable to claim 10.

11. In regards to claim 11, claim 11 is rejected for the same reasons as those used to reject claim 3. The argument is analogous to that presented above for claim 3, and therefore the rejection to claim 3 is equally applicable to claim 11.

12. In regards to claim 12, claim 12 is rejected for the same reasons as those used to reject claim 4. The argument is analogous to that presented above for claim 4, and therefore the rejection to claim 4 is equally applicable to claim 12.

13. In regards to claim 13, claim 13 is rejected for the same reasons as those used to reject claim 5. The argument is analogous to that presented above for claim 5, and therefore the rejection to claim 5 is equally applicable to claim 13.

14. In regards to claim 14, claim 14 is rejected for the same reasons as those used to reject claim 6. The argument is analogous to that presented above for claim 6, and therefore the rejection to claim 6 is equally applicable to claim 14.

15. In regards to claim 15, parts c.i – iv have already been shown in the rejection of claim 9. Scampini discloses an IVUS system in lines 31 – 35, col. 1, which is used for medical imaging.

A processor (figure 7, item 28)

An interface to receive data for the processor to use to create a medical image (figure 7, transducer (18) is shown to have a data path to the processor)

16. In regards to claim 16, Scampini discloses the medical imaging system of claim 15 further comprising a display to display the output image (col. 10, line 3).

17. In regards to claim 17, Scampini discloses the medical imaging system of claim 15 comprising a printer to print the output image (col 10, lines 3 – 4).

18. In regards to claim 18, Scampini discloses the medical imaging system of claim 15 further comprising:

A catheter (figure 1 item 24); and

An ultrasound transducer mounted on the catheter, the ultrasound transducer to be rotated by a motor, the ultrasound transducer to emit ultrasound waves and to receive reflected ultrasound waves, the ultrasound transducer to send reflected ultrasound waves to the interface (figure 1 ultrasound transducer 18 and motor 22; col. 3, lines 55 – 59)

19. In regards to claim 19, claim 19 is rejected for the same reasons as those used to reject claim 2. The argument is analogous to that presented above for claim 2, and therefore the rejection to claim 2 is equally applicable to claim 19.

20. In regards to claim 20, claim 20 is rejected for the same reasons as those used to reject claim 3. The argument is analogous to that presented above for claim 3, and therefore the rejection to claim 3 is equally applicable to claim 20.

21. In regards to claim 21, claim 21 is rejected for the same reasons as those used to reject claim 4. The argument is analogous to that presented above for claim 4, and therefore the rejection to claim 4 is equally applicable to claim 21.

22. In regards to claim 22, claim 22 is rejected for the same reasons as those used to reject claim 5. The argument is analogous to that presented above for claim 5, and therefore the rejection to claim 5 is equally applicable to claim 22.

23. In regards to claim 23, claim 23 is rejected for the same reasons as those used to reject claim 6. The argument is analogous to that presented above for claim 6, and therefore the rejection to claim 6 is equally applicable to claim 23.

### **Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher L Lavin whose telephone number is 703-306-4220. The examiner can normally be reached on M - F (8:30 - 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo Boudreau can be reached on (703) 305-4706. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
**DANIEL MIRIAM**  
**PRIMARY EXAMINER**

CLL